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Code No. : 14109 EES

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) IV-Semester Main Examinations, May-2018

Electrochemical Energy Systems

(Open Elective-III)

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Define a cell and how a battery is different from a cell.
2. Compute the energy density in Wh/Kg of a battery having the weight is 1000 grams which produces 25 amp of current for 3 hours under the potential difference of 50 V.
3. Lithium can be the best component of a battery-Reason.
4. Name the batteries used in pilot balloons and write their advantages.
5. Why KOH is preferable to NaOH as electrolyte for alkaline batteries?
6. Define battery memory and write its effects on a battery.
7. Classify the flow cells based on temperature and mention one example for each.
8. How the reserve batteries are different from other primary batteries?
9. Suggest and explain a method to produce 12.5V from a cell having the emf is 1.25V.
10. Write the advantages of polymer electrolyte membrane fuel cell over other fuel cells.

Part-B (5 × 10 = 50 Marks)

11. a) List out any six characteristics of a battery and explain each term. [7]
b) Define flat discharge rate and suggest what flat discharge rate is preferable for a good battery. [3]
12. a) Explain the electrochemistry of silver peroxide-zinc alkaline reserve battery and write its limitations. [6]
b) Mention various mechanisms to activate reserve batteries. [4]
13. a) Describe the construction and charging and discharging reactions involved in lithium ion cell with neat diagram. [7]
b) Generally Ni-metal hydride battery is preferable over Ni-cadmium battery-Reason. [3]
14. a) Discuss the construction, electrochemistry and applications of molten Carbonate fuel cell with neat diagrams. [6]
b) Mention the merits and demerits of flow cells. [4]
15. a) Illustrate the construction of Li-MnO₂ battery with neat diagram along with the reactions involved in it. [6]
b) List out the difficulties encountered when metallic lithium is used in rechargeable lithium cells. [4]
16. a) Describe the construction, charging and discharging reactions of Ni-Cadmium battery along with limitations. [6]
b) Write the charging and discharging reactions of VRLA battery. [4]
17. Answer any *two* of the following:
 - a) Differentiate between primary, secondary and reserve batteries and mention one example for each. [5]
 - b) Fuel cells are the future source of electrical energy-Justify. [5]
 - c) Write a note on Methanol-oxygen fuel cell. [5]

